Statistical and Data Literacy in Policy-Making

Gaby Umbach*

We live in times of post-factual argumentation, partisan communication, and at times blatantly interest-driven political reasoning. These trends prepare the ground for contested politics in which trust in policy-making critically depends on transparent, legitimate, and accountable political decisions. In these trying times, the transparent, legitimate, and accountable production and use of factual evidence are essential ingredients of successful policy interventions. Over the past three years, the COVID-19 pandemic offered an outstanding example for these developments.

The above-mentioned ingredients are not only essential in times of crisis and decision-making under uncertainty. Reliable factual evidence is an essential resource for 'governing by knowing' in modern times. Contemporary policy design starts and ends with it. Statistics and data are one of the most robust forms of factual, quantitative evidence by which political decisions should be informed. In this sense, they are essential instruments of politics and collective political action. They are used to define policy problems and to evaluate the impact of policies. They help monitor policy success and failure. They serve as a collective memory on the progress of societies. In this way, they increase the quality of policy-making, legislation, and implementation of policies; and help contrast perceptions, support preference-building and back interest-formation within politics.

In informing policy design and development, statistics and data take over multiple functions. They measure and compare performance and progress, evaluate, and assess policies, and open decision-making to scrutiny and control, helping to hold decision-takers to account. Data support strategic and policy planning, set common goals, increase transparency of decision-making, and serve instrumental, conceptual, and tactical purposes. With this multidimensional character, statistics and data have become the renewable energy of 21st century evidence-informed democratic policy-making, in which they play a special role for public policy choices.

Especially with official statistics, we approximate the reality of our societies in a standardised way to support comparability across countries and time. Insights from such comparison are relevant for policy-making across all political levels, from the local to the global. The power of statistics for global development is particularly visible in the United Nation's Inter-Agency and Expert Group on SDG Indicators and the UN's 'Global Indicator Framework'. The latter makes indicators the default monitoring instrument for global policy change by tracking the implementation of the UN sustainable development agenda.

The functions of statistics extend their usage in politics beyond pure measurement. They make numbers perform qualitatively and serve strategic, symbolic, and political interests of actors, such as for ideational leadership, advocacy, and agenda-setting. Their production and use create policy narratives and political power structures. The latter emerge from the use of statistics in politics that reflects normative decisions which are open to contest over the definition, choice, and quality of the quantitative evidence at hand. Both politicians and public officials who request, select, evaluate, translate, and process statistics and data therefore need to understand, be able to work with, analyse and argue with statistics and data. These aspects have become essential challenges for professionals working in public policy-making, analysis, evaluation, and scrutiny.

The multiple functions of statistics and data in politics and the challenges related to their production and use not only impact on how knowledge for policy-making is generated and defined. They also affect how factual evidence is injected into and used in governance. Adding to this complexity, data sources and the ways of using them have diversified, and the ecosystem of statistics is demanding for any non-data scientist. As a consequence, the use of statistics and data in policy-making requires actors to master several types of skills and literacies related to statistics and data. These skills do not only include a sound knowledge of statistics, their use, information content and limitations (i.e. statistical and data literacy in a narrow sense). A broader perspective on statistical and data literacy reveals relevant knowledge, socio-cultural and value dimensions and relates to methodological and technical capacities. The former includes political and systemic literacy (i.e. knowledge about the politics and governance; motivations and interests of actors; policy-relevant knowledge) as well as basic science literacy (i.e. ability to translate scientific results into policy-relevant information; sensitivity towards research processes and environments as well as biases in research designs; the potentially normative character of science advice). Related capacities necessitate, among others, information and media literacy, communication and visualization literacy, digital literacy, computational and machine learning literacy, and numerical and ethical literacy.

As a consequence, an increasing group of actors are required to be data literate. These include policy, business, and data analysts; data scientists; data (protection) officers; data architects and database administrators. The literacies they need range from data collection and production; to data analysis, interpretation and visualisation, trends analysis and predictive analytics; to development of data strategies, creation of institutional data cultures and monitoring of data protection regulations. While particular literacy requirements depend on the role of actors in and their contribution to the policy process, an intersectional literacy understanding, contextualisation and systems thinking are preconditions and facilitators of statistical and data literacy in policy-making.

The International Statistical Literacy Project offers an outstanding platform to engage with the discussion on statistical and data literacy in politics. Under its auspices, we prepared a special stream of the Statistical Journal of the International Association of Official Statistics on statistical and data literacy in policy-making that informed our debate within the December 2022 IASE webinar. You will find more on both our articles on statistical and data literacy in policy-making and the IASE webinar in this newsletter. Everyone interested in engaging in one of the most relevant tasks of our times, conceptualising statistical and data literacy for policy-makers, are warmly invited to join us in our efforts to enhance statistical and data literacy within policy-making and throughout societies. Read more about the topic in this newsletter and get in touch!

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Season's Greetings and Happy New Year 2023

from the ISLP project

ISLP Newsletter 2/2022 **in brief..** ▶▶

 FINLAND

Project News

Elisa Falck*

Many things are currently ongoing in the ISLP.

Firstly, we are happy to announce that our Advisory Board Member, Saleha Naghmi Habibullah, has received the prestigious Achievement Award from the Convocation of Lahore College For Women University Lahore. Congratulations, Saleha!

The Poster Competition 2022-2023 has been running since the start of the year. Many countries from around the world are participating; at the moment, the count is at 24. There is still time to organise a poster competition in your country. We warmly welcome countries to organise a competition – even small competitions at the grassroots level can make a difference!

The Best Cooperative Award is also running and accepting contributions. The field of statistics is full of creative collaborations, as many different kinds of institutions operate in this area. Statistics are taught to people of different ages. Statistics are one of the quickest and most informative ways to paint a picture of the world around us. Do you know a team, a project, or an initiative that has made creative use of this potential? Are there some innovative projects that have expanded statistical literacy in your area? Every entry made into this competition is exciting to discover.

We will also have a session at the World Statistics Congress in Ottawa in 2023, with the title Statistics and data in the decision-making process – how can information providers and Statistical Offices promote their usage and application?

The Project is constantly capacity-building via fund seeking. We welcome our entire network to inform us about funding opportunities, such as open grant calls. Literacy, including statistical literacy, is a global mission!

Happy Holidays from the entire ISLP team – this is rewarding work and it is a pleasure to share the project with all of you!

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ISLP home page
https://iase-web.org/islp/

IRELAND

In this series, we introduce the
members of the ISLP Advisory Board
one by one Today we will introduce
the Chair of the Advisory Board,
Steve MacFeely.

Chair of the Advisory Board:

Steve MacFeely

Steve MacFeely* (1968) holds both Irish and British citizenship. He is the Director of Data and Analytics at the World Health Organization, based in Geneva, Switzerland. He is also Adjunct Professor at the Centre for Policy Studies at University College Cork in Ireland, and an Assistant Director of the IASE International Statistical Literacy Program.

He is co-chair of the Committee of the Chief Statisticians of the UN System (CCS-UN) and of the Committee for the Coordination of Statistical Activities (CCSA), and chairs the Advisory Board of the Statistical Journal of the IAOS and the International Statistical Literacy Project (ISLP), and is a member of the statistical advisory panels to both the UNDP Human Development Index and UNCTAD's Productive Capacity Index.

Steve is an elected member of the International Statistics Institute and a member of the IAOS Executive Committee.

He was a co-lead on the Data Strategy of the Secretary-General for Action by Everyone, Everywhere 2020 – 2022, and a lead author of the 2020 System-wide Roadmap for Innovating UN Data and Statistics.

Before joining WHO, Steve was the Head of Statistics and Information at UNCTAD. Prior to joining the UN, he was the Deputy Director-General at the Central Statistics Office (CSO) in Ireland and Programme Director of the joint CSO–Institute of Public Administration 'Professional Diploma in Official Statistics & Policy Evaluation'.

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USA

A High School Teacher's Journey Through Statistics Education

Gail Burrill*

The Early Years

As a mathematics teacher and department chair in a suburban high school with about 900 students in grades 9 to 12, one of my responsibilities was to monitor a study hall, typically a room with 50 to 100 students who were supposed to spend the period doing homework and studying. It was fairly obvious that the students were typically not engaged in anything productive; on a lark I asked them whether they would take another class instead of study hall – say in data and statistics – if it was offered. And so a semester statistics course was born, a course in which the instructor did not know more than the students, a course with only algebra as a prerequisite, a course that had no textbook and no requirements to meet other than those set by the teacher. Basically, we wandered through a terrain of data with a look at probability including permutations and combinations- a highlight was associating them with Pascal's Triangle. (One student who often struggled was so taken by expanding the terms in a binomal he turned in a paper with $(x+y)^{100}$.) We looked at data where we found it (Figure 1): students collected grocery prices for the same foods at different grocery stores and discovered that location affected price; the Milwaukee Journal, the newspaper at the time, did a lot of market research, and students used the resources produced by the newspaper to investigate whether offering a sale or coupons was more likely to produce higher income; the Green Bay Packer football team shared some of the statistics they gathered (note this was in an era of manually recording these), and students looked at strategies for plays that seemed to work in given situations.

The course thrived, and several years later I was at the annual conference for the National Council of Teachers of Mathematics (NCTM) and discovered a booth for the NCTM/ASA (American Statistical Association) Joint Committee on Statistics and Probability. The booth was staffed by an energetic and dynamic high school teacher from Canada, Jim Swift, who was a member of the committee. Jim introduced me to the Quantitative Literacy (QL) Series (https://www.amstat.org/education/k-12-educators#pubs). I was sold, and soon my students were trying out lessons, creating and interpreting box plots, and simulating probabilities. This led to two landmarks in my statistical journey: becoming a member of the NCTM/ASA Joint Committee and being invited to participate in a four-week summer program on statistics at Princeton University sponsored by the Woodrow Wilson National Fellowship Foundation. At Princeton, 49 high school statistics teachers (probably all of those in the US who were then teaching statistics in a high school) were privileged to have sessions on thinking and reasoning with data led by Dick Scheaffer from the University of Florida, at that time chair of the Joint Committee and Henry Pollack, from Bell Laboratories, to hear talks from John Tukey and John Conway, then on the faculty at Princeton, and to work in small groups with each other to design a project that would be useful back In our home environments. (The project I worked on was designing a curriculum for a high school statistics course.) This led to being selected as one of a team of four to do summer workshops for high school teachers across the United States on teaching statistics and probability. The next seven summers were devoted to spreading ideas for teaching statistics to other high school teachers. One of these found me part of the team picking up Edward Deming at the airport and taking him to a workshop on quality control at Ford Motors.

Magazine features Whitnall course

Is it true that you can prove just about anything with statistics?

Definitely, Gail Burrill, Whitnall High School math teacher, believes. Statistics are such an important part of our life that she has developed a course to make students "statistically literate."

Mrs. Burrill's one semester statistics course was featured in a recent issue of the monthly magazine published by the National Council of Mathematics Teachers.

The course "stresses informal statistics, everyday statistical language and simple statistical techniques," Mrs. Burrill stated in the article.

She has organized it into four major areas: gathering data, organizing data, studying probability and drawing conclusions. Students learn how to take valid random sampling for their own polls and surveys and glean other material from newspapers and other media.

For the final project one of her students checked out prices of 40 items on a shopping list at competing supermarkets to find where a consumer could get the best buy. Another student studied teenage driving and found that boys get more tickets than girls.

The student had initially planned to find out, "Is it true that teenagers have poorer driving habits than adults?" Mrs. Burrill said, but his data was insufficient to draw any valid conclusions.

The girl who did the shopping survey conducted a preliminary survey to see shoppers believed would be the most sive store. The shoppers in her survey rectly identified which grocery charged the highest prices, but it did plain why they chose to shop there and Mrs. Burrill said.

Students in her class often use calcu and computers to help them solve stat problems and analyze results.

Fig. 1 Milwaukee Journal article about the statistics course.
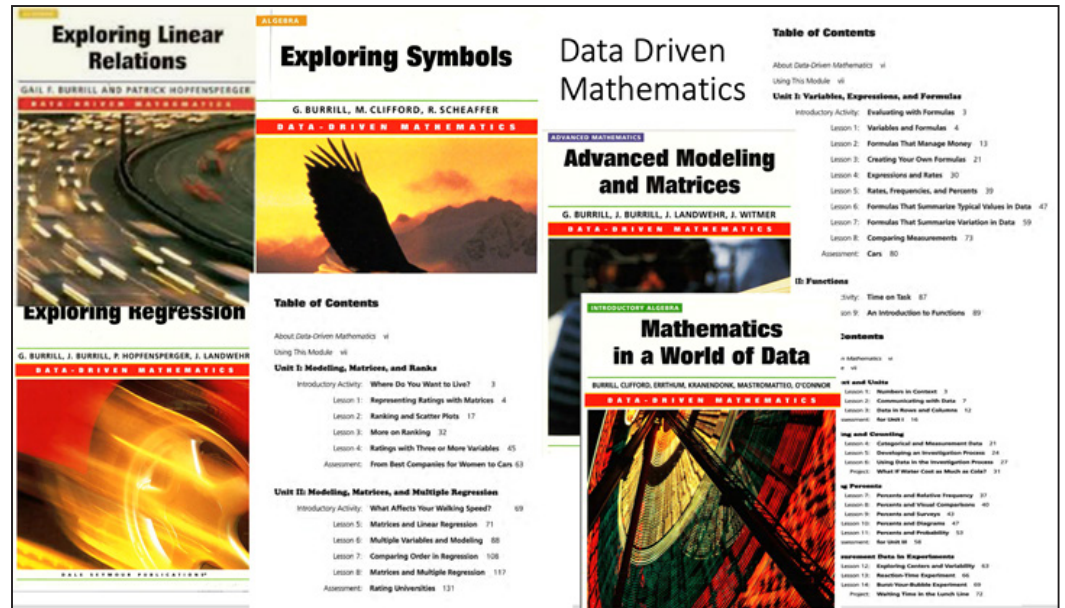
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Fig. 2 Five of the 11 modules in Data Driven Mathematics

The Goal: Integrating Statistics into the School Curriculum

In the mid 1980s NCTM was developing the 1989 NCTM *Curriculum and Evaluation Standards*. The Committee Chair for the standards project shared the first draft with the NCTM/ASA Joint Committee, and it was our chance to make sure that the statistics standards were about central statistical concepts and to use appropriate language in doing so. With the guidance of Dick Scheaffer and Jim Landwehr, from Bell Laboratories, the committee suggested major revisions, all of which were accepted by the standards' authors, and resulted in the inclusion of statistical concepts in the school curriculum, a major step in getting statistics visible and which led to several national curriculum projects that included a focus on developing statistical ideas.

At some point I became chair of the Joint Committee; we received funding from the National Science Foundation (NSF) to support the dissemination of the QL

materials to teachers and schools around the US. Motivated by the success of the QL materials, through ASA we applied for and received a large NSF grant to develop a data based high school curriculum. The 11 modules we produced were comprehensive in scope (see figure 2 for examples), covering many of the key topics in high school mathematics including some that were not part of the standard curriculum but we thought should be (e.g., *Exploring Symbols, Exploring Projects; Exploring Linear Regression*), but did not quite succeed in covering the entire content, geometry in particular.

The materials were never best sellers, but they remain on many bookshelves as resources for ideas on how to use data, for example, to introduce algebraic inequalities. Perhaps one of the biggest impacts was visualizing the squares of residuals and their sum for a linear regression, which now is a standard component of many software packages (Figure 3). The Data Driven materials are freely available from ASA at https://www.amstat.org/education/k-12-educators#pubs.
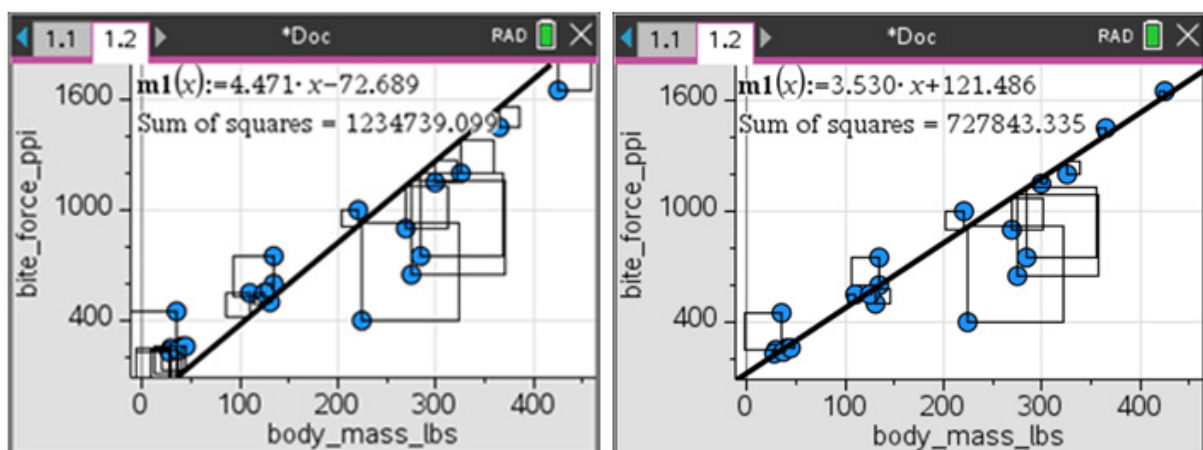

Fig. 3 Visualizing squared residuals for regression lines

Fig. 4 Leading a workshop
on exploring data

Along with the publication of the 1989 NCTM Standards, I became active in promoting statistics education in the United States, writing what might have been the first ever chapter on statistics in an algebra textbook (Foster et al., 1988), coauthoring an activity book to support the statistics standards (Burrill et al., 1992), doing numerous presentations (Figure 4), and serving on various advisory boards related to projects in statistical literacy. In 1994 I was elected a Fellow of the American Statistical Association, then a rare honor for a high school teacher.

Over the years I have been involved in many curriculum projects, often with the charge to focus on statistics. One of the most memorable was working with Dutch educators from the Freudenthal Institute to develop a middle school curriculum that embodied the spirit of the NCTM 1989 Standards. We piloted a unit on data in all of our algebra courses at my high school, and that led to Mathematics in Context, a curriculum for grades 5 to 8, which included six probability units that I wrote with my Dutch colleagues. The Dutch perspective of realistic mathematics permeated the work and the philosophy of engagement and investigation before formalization became part of how I came to think learning including

statistical learning should take place. I was involved in many other curricular writing projects, from co-authoring chapters in a high school integrated curriculum (Core Plus) to curriculum modules for districts and states; some of which encouraged me to dream about what might be (a technology project) and others were based on how to engage teachers in teaching statistics.

I served on committees for the Wisconsin Department of Education and for the state mathematics council, and in the 1990's I became involved with the leadership of NCTM, serving on the Board of Directors and eventually becoming President of the Council. This was a bit of a challenge for a high school teacher, more used to dealing with missing homework than with politics. However, the positive side of being President of a large national organization was that I was able to visit schools across the United States, seeing what great things teachers were doing in their classrooms and working with students to share the fun and excitement of mathematics (Figure 5), and I had a platform to advocate for the inclusion of statistics as a basic component of the curriculum.

Fig.5 Exploring data with
students as NCTM President

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Returning to the classroom was not a likely option after my term as President (I had to resign my high school teaching position to become President), and I was fortunate to be able to work at the National Research Council's Mathematical Sciences Education Board, established to provide a continuing national overview and assessment capability for mathematics education. This was my first real introduction to research in education, not from the perspective of a researcher but of a consumer. It was stimulating and fascinating, and I learned a lot about quality research. Eventually I became Director of the Board but left to return to the world of teaching, this time at Michigan State University (MSU) in the Division of Science and Mathematics Education (which has evolved into the Program for Mathematics Education.) At MSU, I have worked on a variety of research projects, taught courses for elementary and high school preservice teachers including Teaching Statistics and Probability for Elementary Teachers, a mathematics survey course, and courses for graduate students that varied from Teaching and Learning Statistics to Teaching College Mathematics.

Technology

Early on I became convinced that calculators make a difference in who gets to learn and what they learn. In statistics, we started with calculators that had all of the partial formulas (e.g., $\sum(x_i^2; \sum y_i^2 ; \sum x_i y_i)$ so you could put them together to find a correlation coefficient or a standard deviation; this reminds me of where we are now with coding, with subroutines that can be called on to perform certain actions that are common across the analysis of data. I originally used the simulation disc that was developed by the authors of the *Art and Techniques of Simulation*, one of the modules from the QL project, and was fortunate enough to teach statistics in a computer lab. One aha moment was when I came into the lab to find that students were running the software on each machine to simulate a different problem in the homework, which was to find a margin of error for different contexts, same observed sample proportion and two sample sizes. They were supposed to notice that the results were independent of the context but would vary given sample size and sample proportion; however, they were more interested in using the technology than in thinking. Needless to say, we made the lesson work, but it was a reminder for me to once more be careful not to underestimate what students might do despite your intentions. Every student in every class I have taught since has had access to whatever flavor of TI eighty technology was available, and now I have switched to the TI-Nspire™.

Conceptual understanding

I have always been interested in trying to figure out what enables student learning; what do teachers say or do (myself included) and what do they have students do that helps students make the connections. In one of my first years at MSU, I was teaching a statistics course for elementary preservice teachers, with the content fairly underlined similar to an introductory statistics course but with examples taken from education and mindful that these preservice teachers might someday be teaching statistics. About three weeks before the end of the semester, a student came for help before the final exam. One of her first questions was, "What is this standard deviation that keeps showing up?" Pretty taken aback that this late in the course, the concept was foreign to her; I probed and found it true for the rest of the class. In reading the literature about student understanding I found Tall and Vinner's work on concept images (1987), and this has shaped much of my own work over the last 15 years.

The notion of concept image pairs well with technology, and the introduction of the TI-Nspire (in 2007) led me to work with fellow instructors from Texas Instruments' Teachers Teaching with Technology on activities related to high school mathematics and statistics (https://education.ti.com/en/timathnspired/us/statistics). Those of us into statistics made sure that in addition to basic concepts, the activities included concepts with which students often struggle: e.g., power, the meaning of alpha, blocking, outliers and influential points in regression. The release of the *Common Core State Standards in Mathematics* (National Governors Association and Council of Chief State School Officers, 2010) led to working with colleagues Tom Dick and Wade Ellis on a series of apps designed to support teaching and learning of the CCSSM middle school standards in a project called Building Concepts (see https://education.ti.com/en/building-concepts/activities/statistics). I have been using the Statistics and Probability apps in teaching the course for elementary preservice teachers ever since and have found them invaluable. (My students now know what a standard deviation is.) Several of my recent papers describe the results of a research project related to the use of the apps in the course. And I typically do many presentations each year (Figure 6) on the teaching and learning of statistics at local, state, national, and international conferences with the goal of helping teachers and fellow educators recognize the value in slowing down the pace of instruction and attending to the development of conceptual as well as procedural understanding of fundamental statistical (and mathematical) ideas.
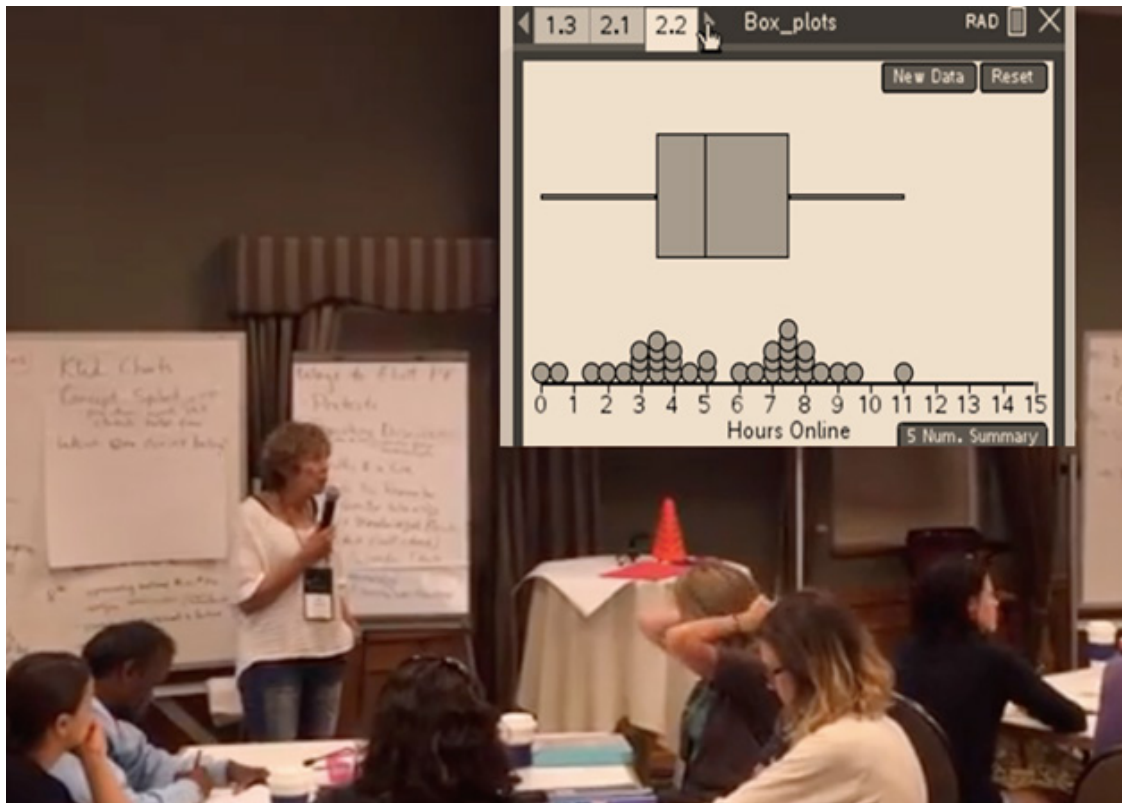
Fig. 6 Leading a workshop on using technology to build understanding

Statistics at the International Level

My first international experience was the 1988 IASE Roundtable on Training Teachers to Teach Statistics held in Budapest, Hungary right before the Sixth International Congress on Mathematical Education(ICME 6). This led to attending the Third International Conference On Teaching Statistics (ICOTS3) in Dunedin, New Zealand in 1990 with a stop in Australia to do a statistics session for a conference in Melbourne (to which I lugged a suitcase of graphing calculators). I helped edit the proceedings of the 1996 roundtable on technology with Joan Garfield, organized the 2004 Roundtable on Curriculum with Mike Camden, and have been very involved in international meetings including serving in different capacities for ICME's ever since, which probably accounts for being elected as President of IASE for 2018-2019. Being President of IASE and my involvement in ICMEs brought me in contact with statistics educators from many parts of the world; I am especially fortunate in this respect to have been able to work on publications about statistics education with statistics educators from countries such as Australia, Brazil, Germany, Israel, the Philippines, and Spain.

The Future: Data Science

As technology continues to increase the availability of enormous amounts of data and correspondingly has increased the need for statistical literacy, statistics education is evolving, slowly but surely. After many years of arguing for the inclusion of statistical reasoning as a legitimate component of the high school curriculum, NCTM's *Catalyzing Change in High School Mathematics* (2018) for which I was a contributing author along with Chris Franklin of the ASA, includes essential elements in quantitative literacy, a major step in incentivizing curriculum developers and textbook authors to include reasoning about numbers and data in the real world and to focus on making data driven decisions and the ability to critique the ways in which these numbers and data are used.

My work over the years has been trying to understand the elements integral to the practice of statistics and to find ways to translate these elements into language and activities that will make sense to learners enabling them to build the necessary foundation to become knowledgeable consumers and producers of statistical information (Gal, 2002; Gal & Geiger, 2022). The recent

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emergence of data science and its connection to statistics has provided another space for me to work with colleagues (https://education.ti.com/en/timathnspired/us/mathematical-modeling), supported by Texas Instruments Education Technology, looking for what concepts are essential in data science and designing ways to engage secondary students and teachers in working with large data sets, challenging old beliefs about what data are, and advocating for the use of statistics as a tool to investigate issues related to real problems that confront all of our societies

Reflection

During this time, I was privileged to work with many, many leading statistics and mathematics educators, all of whom contributed immensely to my understanding and to ways of thinking about the teaching and learning of statistics. Many of these are mentioned above, but I want to call out Dick Scheaffer and Jim Landwehr as being particularly patient in explaining statistical concepts ("What is r^2 ", "Why do we never solve for the explanatory variable in a regression?") and brainstorming with us as teachers to help us make sense of the ideas so we can in turn make sense of them with our students. Colleagues from Princeton such as Dan Teague and Landy Godbold were and have remained invaluable resources in the growth of my statistical understanding. And likewise, supported by funding from Texas Instruments Education Technology, working with Tom Dick and Wade Ellis, both immersed in mathematics not statistics, forced me to articulate and defend the differences in approaching concepts from a statistical perspective rather than a mathematical perspective. The work I have been able to do has indeed "stood on the shoulders of giants", the many teachers and statistics/mathematics educators with whom I worked over the years (and on the patience and support of my husband and family who have always been there).

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MEXICO

ISLP Grant: Mexico

The ISLP Project was able to award an ISLP Grant to one project in the year 2022. In this article, the grant recipients tell of the project that the grant supported.

Jorge Navarro*

The projects supported by the ISLP grant belong to a larger project called "*Development of statistical literacy in 6th grade children through the interpretation of information on ecological and environmental problems*," in a Social Service program of the Autonomous University of Yucatan, in Merida, Mexico. In this program, students with at least 70% of their credits carry out activities to give back to society their skills and knowledge. In the social service project, students receive financial support, mainly for their mobility ($100 Mexican per month), an amount that is not sufficient for the development of other activities.

Purchases
1. Payment of a website domain: culturaestadistica.org.mx
2. Payment of Canva Pro license.
3. Tablet PCs for each participant.

Payment of printing services:
10 infographics, 2 puzzles, 2 posters, 1 story book for children.

Recipients of the ISLP grant
BSc in Marine Biology. Autonomous University of Yucatan
- Jessica Barrios
- José Broca
- Iris Chávez
- Irasema Santes
- Christian Victorín

BSc in Mathematics Education. Autonomous University of Yucatan
- Jordan Yah

Coordinator: Dr. Jorge Navarro. Autonomous University of Yucatan.

Opinion statements expressed by three recipients of the ISLP Grant

The objective of all supported projects was to show the conjunction between biology, ecology and statistics to raise awareness among primary school children about the importance of marine fauna, some of which are in danger of extinction. Several online sessions were carried out in order to achieve this goal, the first of them being a general introduction on biological matters. The other sessions focused on a specific animal: sea turtles, manatees, the Mayan octopus, and marine invertebrates.

Jessica Barrios

The project aimed to make young people between 10 and 13 years old aware of the importance of using statistics in determining the current ecological status of various marine organisms such as the manatee, the Mayan octopus, sea turtles, polychaetas and amphipods. Thanks to the grant provided by the ISLPL we generated clear, simple and funny physical and virtual learning materials: brochures, posters, stories, crossword puzzles, spinners, memory games, animations, comics and a web page. One of the most valuable outcomes of this project has been to realize how important science communication is. We have realized that even though young people receive statistical education, they still struggle with the application of these tools as a means for understanding and/or searching for solutions of real and current problems. However, their active and open minds are willing to learn and apply statistical methodologies, once they find a personal or emotional connection between the statistical method and real events.
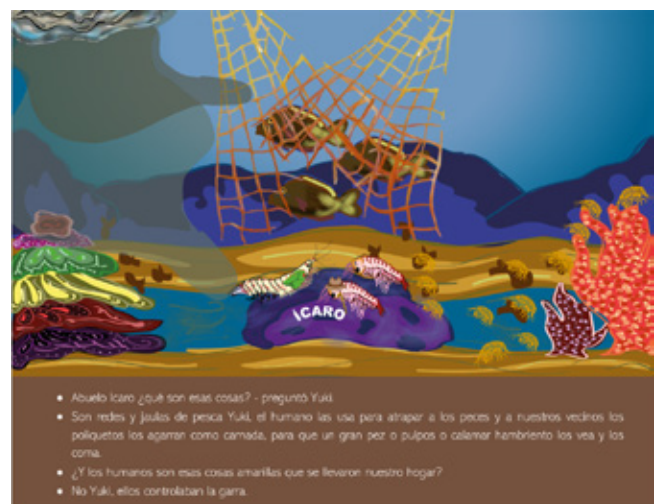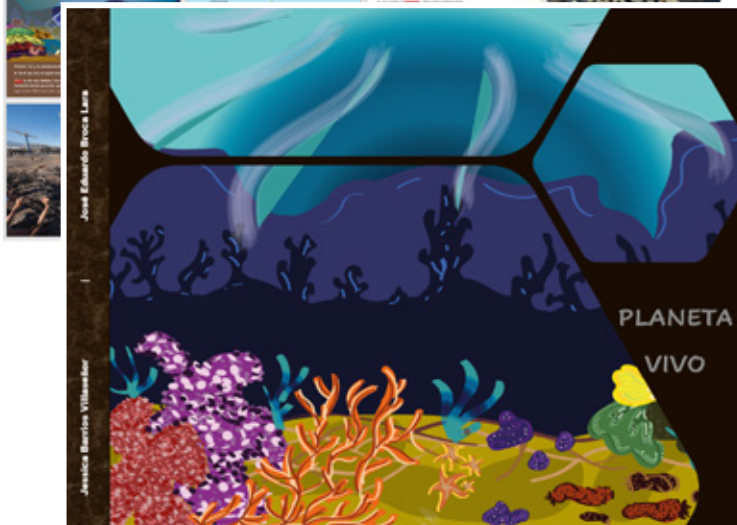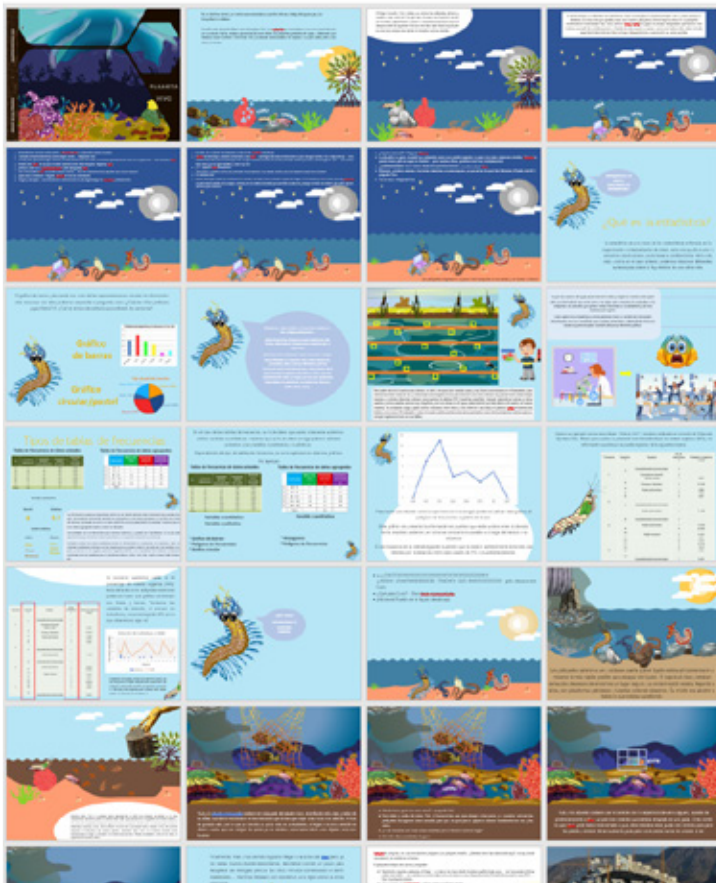
Irasema Santes

"It was a great privilege to have been chosen to participate in a grant program of such magnitude. Environmental education, despite being something so important for the advancement of society and well-being in general, is not difficult to implement. The earlier the awareness about protecting the environment develops, the better for everyone. This is where the role of statistics enters, since it helps us to simplify the information for a better understanding and a greater scope of the environmental issues. I felt great participating in a project that supports the combination of these sciences (Environmental Sciences and Statistics), arousing curiosity and interest in young people. That feeling of being able to transmit knowledge to a large sector of society cannot be equaled, and although it is a grain of sand in the promotion of science, for us as science apprentices, it is something of great relevance and great impact. The opportunity provided is greatly appreciated and we hope it has been useful. Thank you very much!"
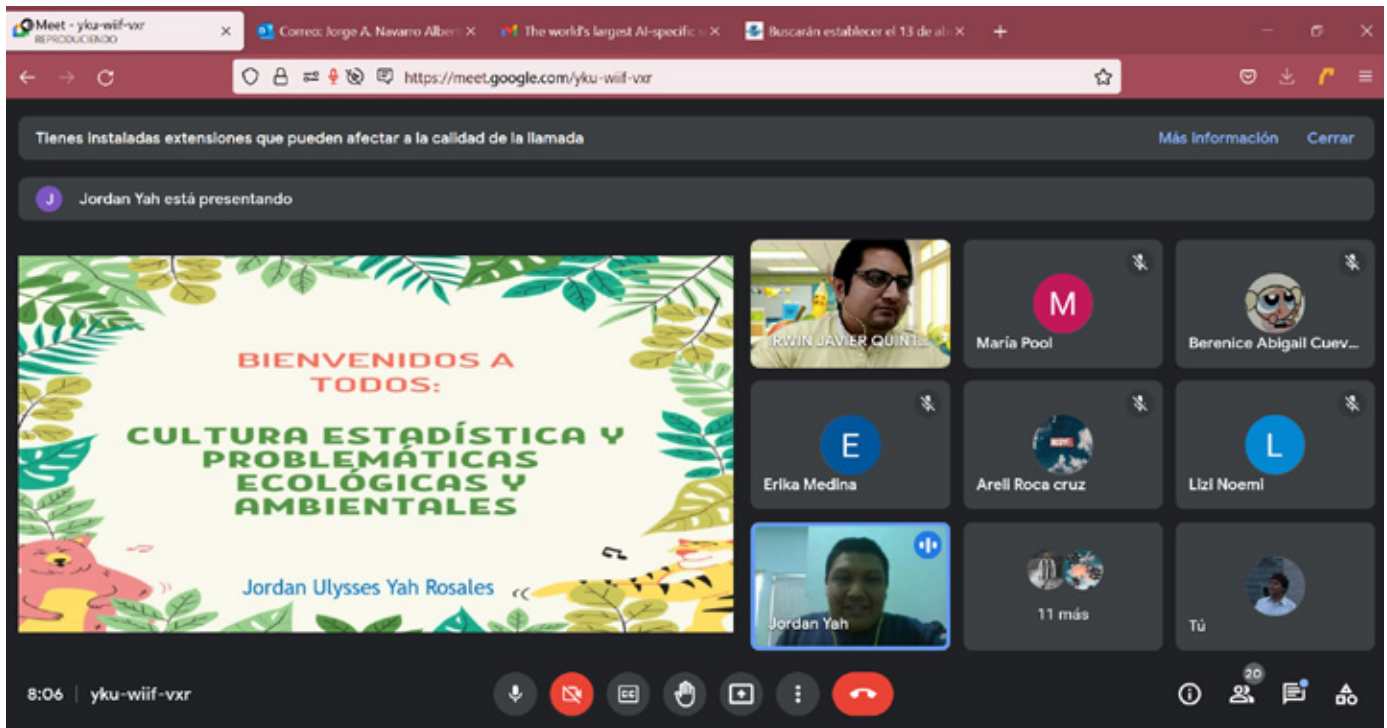
Iris Chávez

"As a university student, I express my gratitude to ISLP that gave us confidence by giving us a grant, since it helped us to teach about environmental issues, a topic of concern for us all. We found that statistics plays a fundamental role in science education with the support of graphs and illustrations. It was a privilege to contribute our knowledge to future generations. In my opinion, children are the best sector of the population to teach about environmental and statistical issues, because from an early age they can learn to care for the environment. Thank you!

Jordan Nah

I am a student doing a BSc in Mathematics Education. I participated in this project showing the importance of preserving one of the endemic species of the state of Yucatan, the Mayan octopus. It really was a great experience to witness how children learn biological and statistical topics when information is presented in a more visual than descriptive way. Infographics were important for this project, because we succinctly showed the most relevant features of the species and the main factors that affect it. I was in charge of creating a website that synthesizes the objectives of the project and each of the marine animals presented to the primary-level students, in order to communicate and share their current situation with a larger audience.

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Development of Statistical Literacy in 6th Graders through Interpretation of Information on Ecological and Environmental Problems

Jessica Barrios*, Iris Chávez**,
Irasema Santes***,
Jordan Yah****

Currently, statistics is a very useful tool in various fields such as economics, chemistry, and research, among others. However, many times there is no clear idea about what statistics is and its purpose. While some define it as a branch of mathematics where data are collected, classified and interpreted, others prefer to declare it as a science that applies the scientific method to decision-making by analyzing numerical data. The truth is that most authors agree that statistics consists of collecting and interpreting data, because what is sought is to obtain results that serve as information for a certain situation.

Within basic education in Mexico, statistics has taken a secondary place since it is placed as a minor subject within the mathematical area. This causes misinformation and disinterest, in addition to the difficulties faced by students whenever they want to analyze and inter-

pret statistical information. In addition, students have the general idea that statistics "are boring and uninteresting."

On the other hand, training in biology is usually very extensive, and although ecology is of great interest to students, it is not well understood. Today we are in an era where we can observe the consequences of human actions on the environment, whether it is its pollution, the overexploitation of natural resources, or the extinction of species. If we continue like this, we will reach a point of no return. Different groups of people seek and propose ways to help the environment; however, it is necessary to have a fixed objective, prior planning, experts in the field, and materials, and time and resources must be invested to make all of this happen.

There is a great lack of knowledge of the joint work that statistics and ecologists can do. It is worth mentioning that, although books about the natural sciences and biology contain statistical data, these are usually ephemeral since they do not specify the origin of the data or the types of biostatistical processes that are used to obtain them; thus creating the ideology that statistical procedures do not play an important role in the interpretation of biological and ecological processes.

A strategy by which a biostatistical culture can be generated among students is to focus on children and adolescents between 10 and 15 years old, since a large part of the Mexican population at these ages completes their schooling. Hence the question: How can we improve statistical literacy in basic education students so that in the future they can get involved more easily in situations that require it?

We believe that science and statistics complement each other in an extraordinary way and, because of this, we decided to make graphic material on environmental situations focused on marine biology. We chose marine biology because it is of great interest to children and adolescents in this age group, mainly because the cognitive level of the students is more developed in a visual than descriptive way.

We were excited to gather information through the use of technology and other programs to develop infographics. We created a web page that synthesized the objectives of the project and each of the animals that were presented to the students, in order to communicate the current situation of these animals more broadly. We hoped, perhaps, to patent the page. Other materials were animations, stories, crossword puzzles, roulettes,

comparisons of current and real situations with scenes from animated films, and comics, among others.

These materials were communicated through talks on the current situation of the manatee, the Mayan octopus and sea turtles, in addition to talks on the impact generated by the five environmental problems: climate change, invasive species, overexploitation, habitat fragmentation and pollution in species of polychaetas and amphipods.

The results obtained so far have been amazing, as there was great interest on the part of the participants. By explaining our topics with visual supports, the dissemination of information was effective as well as entertaining for the public. Students could therefore visualize the different graphic representations of the information (such as bar graphs, pie charts, etc.). Students could then generate a relationship between what was presented and their personal experiences, allowing a connection with the topics. To take the commitment to good learning a little further, didactic material was printed for the students, so that the participants will have the information provided by us.

It was interesting to see that the students were initially more enthusiastic about those topics that covered flag species such as the manatee and sea turtles due to ignorance of the other species. Likewise, since ecology is a very practical field, the presence of the COVID-19 pandemic represented a great challenge to get students to understand the data collection processes. However, despite the lack of knowledge and/or practice, the students showed great interest in the development of the activities with their participation and questions, in addition to requesting alternatives to continue inquiring about the topics later. We therefore achieved the objective of generating interest in the use of biostatistics.

*, **, ***: Universidad Autónoma de Yucatán,
   BSc en Biología Marina.
****: Universidad Autónoma de Yucatán,
   BSc en Educación Matemática.

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ECUADOR

* Directora Ejecutiva
  Sociedad Ecuatoriana de Estadísticasee
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Cuentos de Cuentas

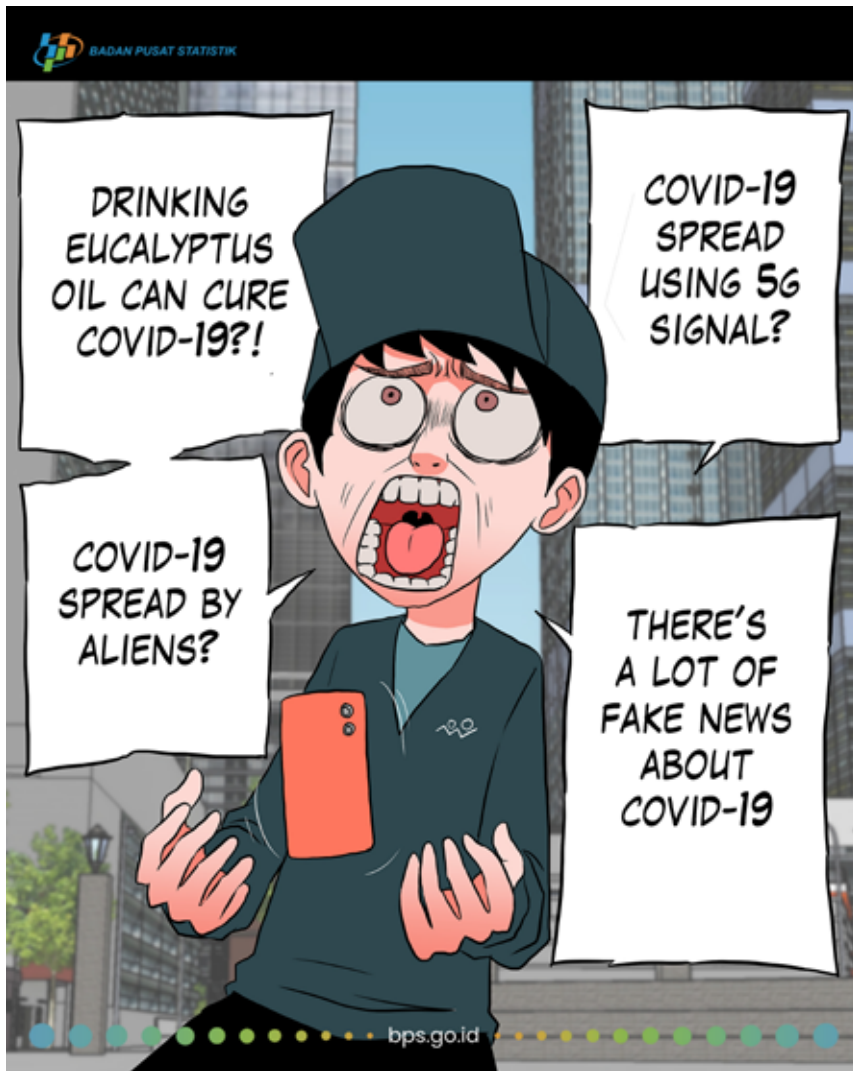Gabriela Castro*

 INDONESIA

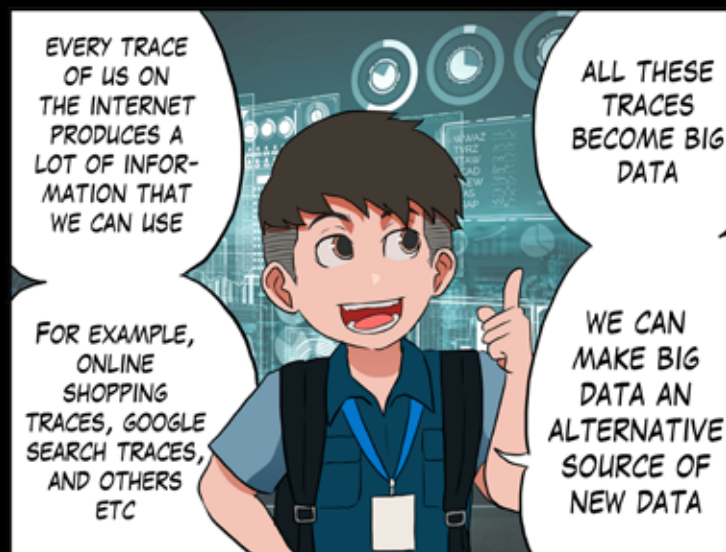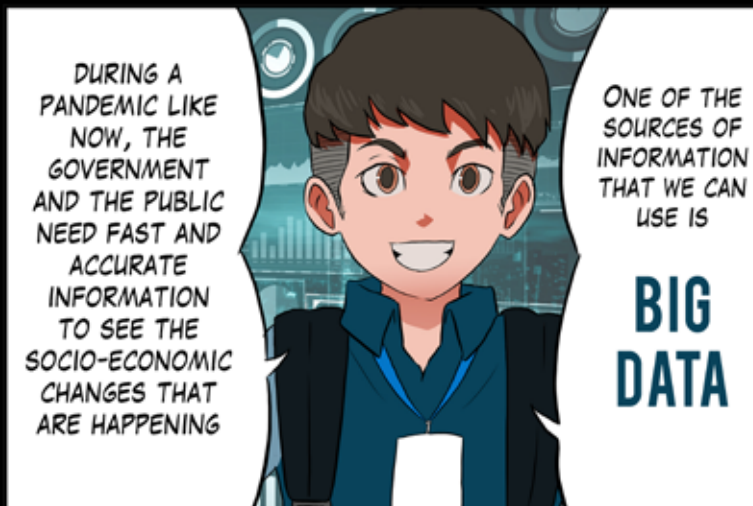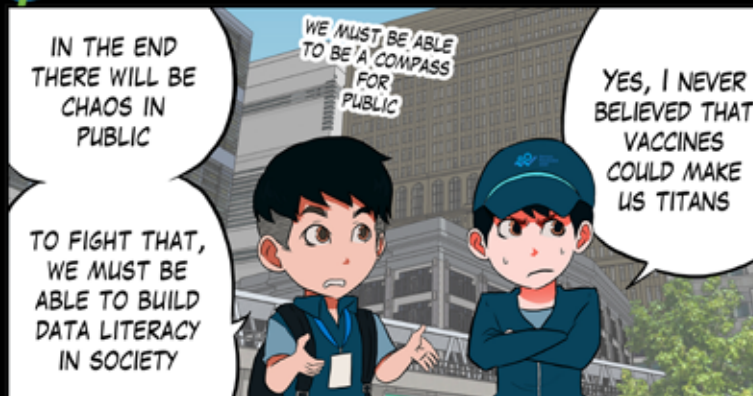# Big Data Comics

Maulana Faris*

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🇪🇨 **ECUADOR**

New ISLP Country Coordinator for Ecuador

Gabriela Castro*

My name is Gabriela Castro. I am Ecuadorian. I live in Quito, which is considered the middle of the world. I studied Mathematical Engineering as an undergraduate student, and I also have a master's degree in Development Economics. I am the first female president of the Ecuadorian Statistical Society (Sociedad Ecuatoriana de estadistica – SEE). Nowadays, I am the Chief Executive Officer at SEE.

To start with, I could say my main interests are related to social matters related to poverty, education, health, gender, and citizen welfare, and I worked at the Instituto Nacional de Estadística y Censos (National Institute of Statistics and Censuses) in my country.

Secondly, I have had the opportunity to organise International Statistics seminars, academic meetings, and events such as the Women in Data Science Ecuador. Since then, I have actively advocated statistical culture in Ecuador and Latin America, such as promoting data-driven policy-making.

Thirdly, I would like to express my enthusiasm to work for statistics education by creating an educational environment for children, teenagers, and other young people that teaches them statistics skills so they are able to apply them in real life.

Essentially, there is a prejudice among Ecuadorians that mathematics and statistics are complicated and difficult to understand. And that is the reason why I would like to promote and/or implement activities that allow us to change this way of approaching these subjects.

I truly believe that education improves people's lives; therefore, providing statistical learning could enable children, adolescents, and young people to achieve greater opportunities to work in the future. I strongly believe statistics education must begin among all teachers in schools, colleges, and universities for transmitting that knowledge in a meaningful way to children and young people.

Moreover, Ecuadorian Statistical Society members have developed storytelling apps suitable for children, instructional videos for high school students emphasising the reasons for studying statistics and data science, and workshops for undergraduate students. In addition, we recently launched a pilot project involving university students tutoring school students in a city where poverty levels are the highest in Ecuador.

In summary, the success of all these activities motivate me to continue with the main aim mentioned above, as well as to generate further activities which could be shared in Ecuador.

I am looking forward to exploring the experiences, processes, and activities which are implemented regarding statistical empowerment in other countries.

Warm regards to all new country coordinators, and best wishes for achieving success in this new challenge.

* Chief Executive Officer, Ecuadorian Statistical Society
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 ECUADOR

Nueva Coordinadora de ISLP para Ecuador

Gabriela Castro*

Mi nombre es Gabriela Castro, vivo que Quito que se encuentra en la mitad del mundo; tal vez algunos conozcan las Islas Galápagos. Me gradué como Ingeniería Matemática y cuento con un máster en Economía del desarrollo. Soy la primera mujer presidente de la Sociedad Ecuatoriana de Estadística y actualmente soy su Directora Ejecutiva. He teniendo la oportunidad de organizar Seminarios Internacionales de Estadística, encuentros académicos, eventos como el Women in Data Science Ecuador. Desde esta organización trabajo por el fomento de la cultura estadística en Ecuador y Latinoamérica, así como en la toma de decisiones basadas en datos. Adicionalmente, trabajé en el Instituto Nacional de Estadística y Censos. Mis principales intereses se han relacionado con temas sociales como pobreza, educación, salud, género y seguridad ciudadana.

Lo que me motiva a trabajar por la alfabetización estadística es porque me gustaría generar espacios para que niños, niñas, adolescentes y jóvenes conozcan estadística y que la puedan usar en su vida cotidiana. Se conoce que en Ecuador existe el prejuicio de que las matemáticas y la estadística son complicadas y difíciles de entender; en este sentido, me gustaría articular acciones, con otras organizaciones que están interesadas por la educación en el país, para planificar y ejecutar actividades que nos permitan cambiar esta forma de ver la estadística.

Estoy convencida de que la educación es uno de los factores que pueden mejorar la vida de las personas, por lo que educar en estadística puede permitir que niños, niñas, adolescentes y jóvenes tengan a futuro más oportunidades en el mundo laboral.

También, considero que la alfabetización debe empezar con los profesores de escuelas, colegios y universidades para que ellos transmitan de mejor manera el conocimiento de estadística; es así, que hace mucha falta capacitar y brindar recursos tanto materiales como tecnológicos para enseñar mejor.

Como Sociedad Ecuatoriana de Estadística hemos desarrollado aplicaciones de cuentos para niños, videos para estudiantes de colegio de por qué estudiar estadística y ciencia de datos, talleres para estudiantes universitarios. Adicionalmente, hemos comenzando un proyecto piloto para que estudiantes de una universidad enseñen a estudiantes de un colegio en una de las cuidades con más niveles de pobreza en Ecuador.

Estar logrado esto me motiva a continuar y generar más iniciativas que puedan ser difundidas en Ecuador.

Estoy muy emocionada por poder conocer la experiencia, procesos y actividades que se realizan para la alfabetización estadística en otros países.

Les envío un saludo especial a todos los nuevos coordinadores país y les deseo el mayor de los éxitos en este nuevo reto que emprendemos.

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SAUDI ARABIA

New ISLP Coordinator for Saudi Arabia

Noura AlJuhani*

I am a management student at college of business administration, King Saud university. My responsibility as a Saudi woman is to encourage all students and young people to show what they can do. I'm here to show the world the potential of Saudi students and highlight their efforts and excellence in various fields around the world. I look forward to encouraging all students to participate in the International Statistical Literacy Poster competitions and developing their potential & skills to win internationally.

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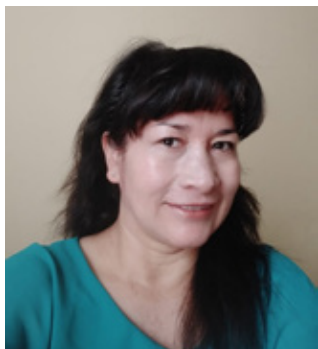
PERU

New ISLP Coordinator for Peru

Yheni Farfán*

Yheni Farfán Machaca, peruana con residencia en el Cusco, es profesora asociada del Departamento Académico de Matemática y Estadística de la Universidad Nacional de San Antonio Abad del Cusco, ostenta el grado de Dr. En Estadística matemática, con experiencia docente en el área de estadística, regentando cursos de estadística en el pregrado de la Facultad y en las diferentes maestrías de la Escuela de Posgrado de la UNSAAC. Como miembro de la Sociedad Argentina de Estadística (SAE) mi participación en los diferentes eventos ha sido permanente en los últimos cinco años.

A la fecha me encuentro comprometida con la investigación en la búsqueda de propuesta de soluciones locales y regionales al desarrollo de la población, a través de los Fondos de Estímulo de Investigación universitaria de la universidad donde laboro, de cuyo fondo soy activa participante.

El Perú es un país de contrastes donde existe muchas limitaciones para la toma de decisiones debido a la ausencia de base de datos de las diferentes actividades económicas, sociales, ambientales e institucionales. En este sentido, se hace ineludible extender la alfabetización de la estadística a los alumnos de los últimos grados del nivel de primaria, así como a los estudiantes del nivel secundario y pregrado, no solo en el conocimiento y manejo de las estadísticas elementales, sino también para inculcar una conciencia de saberes estadísticos para que se desempeñen como ciudadanos y tengan las evidencias estadísticas para exigir sus derechos.

En este reto, se prevé inicialmente realizar una campaña de motivación para participar en el concurso de póster 2022 – 2023 a nivel nacional y a nivel internacional en el ISLP.

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🇮🇳 **INDIA**

New Country Coordinator for India

Gandhiya Vendhan*

Dr. S. Gandhiya Vendhan completed his Ph.D and M. Tech in Information Technology from Anna University. He received Post Doctoral Fellow from IIT and ICMR New Delhi, India. He completed International Six Sigma Master Black Belt from ISI, Advanced Data Science from iNeuron and also certificated Data Science, Big Data & IoT from SAS. I completed an M.Sc and M.Phil from Bharathiar University.

He is currently an Assistant Professor from Bharathiar University since 2016. Before, he has been with an Assistant Professor from Tamil Nadu Agricultural University and several engineering institutions.

He has more than 11 years of teaching experience and 18 years of research experience of imparting Information Technology, Statistics, Data Analytics, Six Sigma Training and projects which includes learners from different streams, faculties and certifications to corporate employees. He has strong contribution in syllabus framing of various subjects at the several universities, academic institutions and other level.

He organized the international/national programs several times. And he awarded multiple honours such as outstanding academic, research award, UGC Post Doctoral fellowship from Indian Institutes of Technology (IIT) and University research fellowship.

He has authored or co-authored several papers in refereed international journals and conferences. He participated in several international and national con-ference, seminars, workshops, symposia. He attended in refresher course, orientation course, summer school, short term training programme, faculty development programme and other training programmed. He has successfully completed many certifications. He is also the resource person at the various events. Various invited talks have been delivered by him through his academic career. He has also served in various committees for various academic, administrative and evaluation purposes.

He is the editor and editorial board member of several high-reputed journals. He serves a reviewer of many international journals, international and national conferences. He has been also general chair, co chair and sessions of many international conferences, including IEEE and other international conferences. He is the acting of as committee such as IEEE, ACM, Springer, Elsevier, Scopus and others. Active professional member of IEEE, ACM and so on.

In Scope: Promote statistical literacy at school levels. Out Scope: Governments need statistics for programme planning, administration and policy formulation in national level many of the socio economic challenges.

Thank you for your support and given a great opportunity to work with ISLP ISI.

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INDIA

New Country Coordinator for India

Prajamitra Bhuyan*

I am an Assistant Professor in Statistics at the Indian Institute of Management, Calcutta. Prior to joining IIM Calcutta, I held a Lecturership in Mathematical Data Science at the Queen Mary University of London. Also, I was engaged with the data-centric engineering programme at the Alan Turing Institute. My primary research interests lie broadly in statistical data science and methodology. Overall, my work has already resulted in 14 papers that appeared in leading statistics journals, including the Annals of Applied Statistics and Journal of Royal Statistical Society. My current work promises to be an important and influential contribution, with implications extending to epidemiology, transport engineering, and life sciences.

I have several years of industry experience as a Statistician in the Analytics sector providing training and business solutions to global clients across industry verticals. I joined the Analytics industry after completion of the M.Stat program and worked for organizations like Genpact and PricewaterhouseCoopers. I was appointed as the High Maturity Enabler for the CMMI certification programme during my tenure in PricewaterhouseCoopers. As an independent consultant, I managed on-site projects in the UK and USA for premier brands like Barclays Wealth and Moody's Analytics. I was responsible for hiring, mentoring and managing a group of talented individuals, managing business expectations, ensuring quality deliverables, adhering to audit and compliance. I am also experienced in conducting training programmes on Business Analytics and computational Statistics for industry and academia.

A study conducted by the PHD Chamber of Commerce and Industry and the Department of Scientific & Industrial Research emphasized the need for strong industry-academia collaborations to encourage innovation in research and development in India. Students will learn and engage in real-world problem-solving as it brings together the applicability of theoretical knowledge in real-life situations. While the industry will find job-ready students who need less training, the universities will build their brand by designing a state-of-the-art curriculum for graduate and doctoral studies. In this context, practical knowledge and skills in Statistics are in high demand due to the recent boom in the Analytics industry in India. Unfortunately, remote areas of India are yet to tap the benefits of data-driven emerging markets. I believe that working as a country representative provides the opportunity to serve the discipline by enhancing statistical literacy among the underprivileged potential talents in India.

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ARGENTINA

New Country Coordinator for Argentina

Graciela Gonzalez*

Voy a comenzar presentándome, mi nombre es Graciela Gonzalez, resido en la ciudad de Venado Tuerto, al sur de la provincia de Santa Fe, en Argentina ("la bota" si miras un mapa). Hace tiempo estudié en la Facultad de Ciencias Exactas, Ingeniería y Agrimensura, UNR, en Rosario, ¿Qué estudié? El "Profesorado en Enseñanza Media y Superior en Matemática" y la "Licenciatura en Matemática" pero luego decidí volver a mi ciudad, en la cual trabajé en varias escuelas secundarias y distintos terciarios, haciendo camino y ganando experiencia, en el presente coordino el Profesorado de Educación Secundaria en Matemática de ICES, en Venado Tuerto, el cual también tengo a carga algunas cátedras. ¿Por qué me gustaría promover la alfabetización estadística en mi país? Es sumamente interesante promover la Alfabetización Estadística, su importancia radica principalmente en formar ciudadanos críticos, que puedan leer de manera adecuada la información que los rodea a diario, y que muchas veces intenta engañarlos. Es crucial, cuando se enseña Estadística, no quedarse en el cálculo de medidas y aplicación de fórmulas, sino en interpretar los resultados, reflexionando sobre los mismos, dando sentido a los mismos en el contexto de las situaciones, que se analicen. En la actualidad, la Estadística forma parte de la mayoría de las carreras de postgrado, pues resulta fundamental para leer críticamente y producir investigaciones de calidad. En lo personal trato de capacitarme e intento llevar al aula lo aprendido, debido que por el momento estoy a cargo de dos cátedras de Estadística y Probabilidad en el Profesorado de Educación Secundaria en Matemática.

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![eurostat logo]

European Statistics Competition

Tiny Vandewiele*

The European Statistics Competition is Eurostat's biggest statistical literacy project and one of its main initiatives aimed at young people. The competition is the result of a strong collaboration between Eurostat and the National Statistical Institutes (NSIs) within the European Statistical System (EU and EFTA countries). It has become a tradition in many countries; its sixth edition is currently ongoing.

Statistical competitions as part of the battle against disinformation

Many European statistical institutes act to improve statistical literacy of the general public, and more specifically, students. Countries try to bring statistics closer to pupils by creating games, by creating statistical learning corners on their websites, by collaborating with teachers, and so on.

One of such actions undertaken by several countries was the organisation of a statistics competition along the lines of other scientific contests like Mathematics or Physics Olympiads.

Within the European Statistical System, the idea grew to join forces and create an international collaboration for this competition, at least at European level. This led to the European Statistics Competition (ESC). The aim of the ESC is to promote statistical literacy among students, while encouraging teachers to use new educational materials based on official statistics.

Eurostat part finances the competition through grants. There is a yearly call for proposals for participation in the competition and every second year a call for proposals for coordination of the competition. Since the start, INE Spain has been the coordinator.

Teamwork to solve statistical problems at national and European level

The European Statistics Competition is school- and team-based. Secondary school students form teams and compete against each other by solving statistical problems, searching for data and producing statistical analyses. There are two age categories: 14-16 and 16-18.

All assignments in the competition are related to statistics from different perspectives: there are questions related to theoretical knowledge (questions about probability, regressions, etc.), questions about official statistics publications, assignments about the philosophy of official statistics... Some assignments require

![ESC European Statistics Competition poster, School Year 2022 2023, Build your team! with INE Instituto Nacional de Estadística and eurostat logos]

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theoretical knowledge whereas others require searching for information or creativity skills.

As the competition reflects the different curricula across Europe, it is split into two phases:

1. The national phase, during which students compete against their peers in their own country using questions corresponding to their studies; and
2. A European phase, where the finalists represent their countries at European level and produce short videos on a statistical topic.

Countries decide about the design and testing of their national phase. In this way, countries can assure that the national competition corresponds to their educational programs. The coordinating NSI provides a model which interested countries can follow (including the platform,

suggestions for the questions of the tests and user support).

The national champions–up to four teams (two per category of participation) per country–participate in the European finals.

In the European finals, teams prepare a video on a particular statistical topic appealing to young people. They need to use official statistics to support their message. Last year's topic was the environment.

An international jury decides the finalists and the winners. The jury varies each year and is mainly composed of experts in statistics and communication, and people working with/for youth. We also include members with experience in the topic the competition is about in a given year.

The prizes are awarded in a ceremony, which has taken place in different European countries, or online during the period of COVID restrictions.

A success thanks to the strong collaboration within the European Statistical System

The first ESC was organised jointly by Eurostat and 11 National Statistical Institutes in the school year 2017-2018. The competition reached over 11 000 students that year. The second edition attracted 12 000 students from 14 countries and the third edition over 17 000 students from 17 countries. To follow up these three successful editions, the fourth edition of the ESC was launched in autumn 2019….

…But then, the COVID-19 pandemic hit…. Events were cancelled, schools closed, students were unable to work together physically. Doubt reigned in the ESC communi-

ty: should we continue or cancel the competition? We decided to continue with the competition while giving maximum flexibility to the countries to get it organized. Thanks to the strong team spirit between the different NSIs involved and the support of the Eurostat hierarchy, the edition became a success with the participation of over 11 000 students from 16 countries.

The fifth edition of the ESC took place in the school year 2021/2022. With over 17 000 students from 19 countries, the participation was back to pre-Covid-19 levels.

Let's hope the sixth edition will be equally – or more – successful! It is currently ongoing in 19 countries. 18 countries participated also in previous editions of the competition: Belgium, Bulgaria, Croatia, Cyprus, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Poland, Portugal, Slovenia and Spain. One country is new to the competition: Slovakia.

Link to the current edition: ESC_2023 (esc2023.eu)

Link to the Eurostat news article on the podcast on the European finals: https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/edn-20220810-1

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ARGENTINA

Coloquio Argentino de Estadística y VII Jornada de Enseñanza de la Estadística

María Virginia Piergentili*,

María Cristina Martín**

Esta nueva edición del XLIX Coloquio Argentino de Estadística (CAE) y VII Jornada de Enseñanza de la Estadística (JEE) marcó el regreso a la modalidad presencial (a excepción de algunas conferencias) de los encuentros que, desde 1952, organiza anualmente la Sociedad Argentina de Estadística (SAE). En esta oportunidad, las actividades se desarrollaron del 1 al 4 de noviembre de 2022, en la Universidad Nacional del Sur (UNS), Bahía Blanca, Argentina. Se recibieron 181 inscripciones y se acreditaron 142 participantes, en su mayoría provenientes de Argentina, con presencia de colegas de Chile, Brasil y Paraguay. Aproximadamente, la mitad participó, tanto del XLIX CAE como de la VII JEE.

La organización del evento estuvo a cargo del Departamento de Matemática de la UNS, y docentes investigadores del área de la Estadística conformaron el Comité Organizador Local, presidido por las doctoras María Cristina Martín y Fernanda Villarreal.

El Comité Científico lo integraron Javier Bussi (UNR), María del Pilar Díaz (UNC), Gonzalo Mari (UNR- INDEC), Beatriz Marrón (UNS), Jorge Martínez (UNS), Silvia Ojeda (UNC), Susana Ozán (UNSJ), Marta Quaglino (UNR), Martín Saino (UNC), Ana María Sfer (UNT), Gonzalo

Vicente (UNCu), Marina Valdora (UBA) y Fernanda Villarreal (UNS). Los mencionados fueron encargados del referato de 53 resúmenes recibidos para ser expuestos en la modalidad oral y 44 en la modalidad pósteres, además de 4 trabajos que participaron en el concurso de pósteres para estudiantes de grado.

Las actividades académicas se complementaron con diferentes encuentros sociales, entre los que se destaca un vino de honor realizado en la Casa de la Cultura de la UNS y un paseo gratuito por la ciudad de Bahía Blanca y el Puerto de Ing. White, ofrecido por el Municipio local.

## Actividades desarrolladas en la VII JEE

Con el objetivo de promover la enseñanza de la Estadística en todos los niveles educativos, aunque colocando un especial énfasis en la enseñanza a nivel primerio y secundario se crearon, en 2015, las JEE.

La VII JEE reunió todas sus actividades en un único día, que comenzó con la Conferencia a cargo de la Dra. Carmen Batanero (Universidad de Granada, España) denominada *"Sentido estadístico y su desarrollo"*, abordando las ideas y los componentes del razonamiento estadístico que se requieren en múltiples situaciones cotidianas, además de resaltar la importancia del trabajo con proyectos para el desarrollo del sentido estadístico.

La actividad central de esta VII JEE estuvo enmarcada en el taller denominado *"Enseñanza de la Estadística basada en proyectos con aplicaciones móviles"*. Estuvieron a cargo del mismo las docentes Mg. Janina Roldán, Esp. María Paula Dieser y Lic. Laura Wagner, todas ellas de la Universidad Nacional de La Pampa. En una primera etapa, las docentes expusieron el objetivo del taller que planteaba trabajar diferentes saberes propuestos en el eje "en relación con las probabilidades y la estadística", descritos en los Núcleos de Aprendizaje Prioritarios de Matemática para la educación secundaria, a través de un proyecto y utilizando aplicaciones móviles. En una segunda instancia se invitó a los participantes, divididos en grupos, a descargar en sus dispositivos móviles alguna de las apps sugeridas y realizar una actividad que luego fue puesta en común entre toda la concurrencia para sacar en conjunto conclusiones respecto a las ventajas y desventajas de las mismas. El abordaje se hizo considerando el tema *Estadística Descriptiva.*

La VII JEE culminó con la conferencia a cargo del Dr. Mario Di Blasi Regner (UTN-FRGP) titulada *"Aspectos Técnicos de las Evaluaciones Estandarizadas"*, describiendo y especificando las características y los modelos teóricos que se involucran en los instrumentos de evaluación implementados hoy en día, tales como las pruebas Aprender.
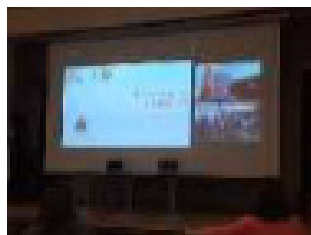
Giovani Silva (Universidad de Lisboa-Portugal) → estuvo a cargo de la conferencia de cierre hablando sobre "Modelado espacio-temporal conjunto de diferentes tipos de resultados: Una aplicación a los incendios forestales bajo un enfoque bayesiano".
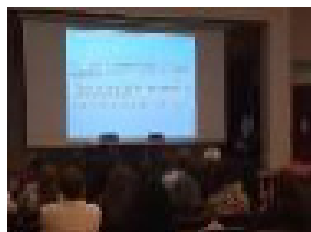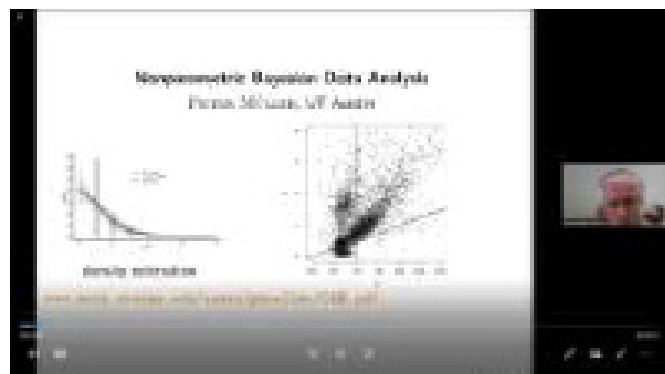
Actividades desarrolladas en el XLIX CAE

Luego de un pequeño acto inaugural, con la presencia de autoridades → de → la → UNS, Rector → → y → Decana → del Departamento de Matemática, más la presidente de la SAE, el XLIX CAE comenzó sus actividades específicas con la conferencia del Dr. Peter Müller (Universidad de Texas, USA) que llevó el título *"Análisis de datos usando modelos no paramétricos bayesianos"*. A seguir, se organizó → una → presentación → de → tesis → doctorales recientemente defendidas. Las flamantes doctoras de la UNR, Luciana Chiapella y Sofía Ruiz Suárez presentaron los trabajos *"Impacto de estrategias para el tratamiento de información faltante sobre la estimación de modelos de regresión de Cox"* y *"Avances en modelos espacio- estado para el análisis de movimiento y comportamiento animal"*, respectivamente. En diferentes momentos del desarrollo de actividades, se ofrecieron otras conferencias magistrales a cargo de la Dra. Marina Valdora (UBA), quien expuso sobre *"Regresión Logística con covariables funcionales"*, la Dra. Georgina Flesia (UNC) sobre *"Usos de la transformación SynchroSqueezing (SST) en la detección de componentes estacionales series de tiempo provenientes de estudios de comportamiento"*, el Dr. Marco Lavagna (INDEC) presentó *"Avances y desafíos del Censo 2022"* y el Dr.

En los sucesivos días del evento, se dictaron tres mini-cursos con una duración de 8 horas reloj cada uno, que contemplaron las temáticas: *"Introducción al análisis de datos con Python"* a cargo del Dr. Walter Sperat; *"Estadística Bayesiana con aplicaciones en R y Python"* desarrollado por los doctores Enrique Álvarez y Maximiliano Riddick (UNLP) y *"Modelos de clasificación supervisada. Aplicaciones"* dictado por las doctoras Susana Ferrero y María Gabriela Palacio (UNRC).

Los participantes acercaron sus investigaciones a través de comunicaciones orales (fueron difundidos un total de 34 trabajos) y de pósteres (se exhibieron 36 trabajos). En ambos casos, los autores tuvieron la oportunidad de exponer sus investigaciones y resultados, contando con 15 minutos de exposición y 5 para preguntas y comentarios en la modalidad oral, y 5 minutos de exposición y un tiempo libre al final de cada sesión para conversar con los autores en el tema de interés, en el caso de los pósteres.

Es de destacar que hubo un espacio especial para los estudiantes de grado, a través de un Concurso de Pósteres. Se presentaron 4 trabajos, cuyos autores exhibieron y expusieron, resultando un Primer Premio compartido entre el trabajo de estudiantes de la UNR y el de los estudiantes de la UNC, la Primera Mención la recibió el trabajo de los estudiantes de la UNLPam y la Segunda Mención fue otorgada al trabajo de los estudiantes de la UNTREF.

Finalmente, se destaca la Asamblea anual de la SAE realizada durante el evento, que decidió que en 2023 el L- CAE se desarrolle en dependencias de la Universidad Nacional de Cuyo, en la ciudad de Mendoza, lugar dónde allá por 1952 se llevara a cabo el 50 Coloquio Argentino de Estadística. Los esperamos !!!

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Docentes investigadoras de la Universidad Nacional del Sur, además de miembros de la Sociedad Argentina de Estadística y del Comité Organizador Local.

🇫🇮 **FINLAND**   🇩🇪 **GERMANY**   🇮🇪 **IRELAND**   🇮🇹 **ITALY**   🇺🇸 **USA**

IASE Webinar

Statistical and Data Literacy in Policy-Making

7 December 2022

Gaby Umbach*

The December 2022 IASE webinar on "Statistical and Data Literacy in Policy-Making" was organized by the International Statistical Literacy Project (ISLP), a project that aims to advance statistical literacy worldwide. The webinar was based on the SJIAOS special stream on "Statistical and Data Literacy in Policy-Making" (Vol 38(2), 2022). As the publication did, the webinar offered conceptual reflections on statistical and data literacy in policy-making. In their presentations, the contributing authors reflected on the relevance of the use of statis-

tics and data in politics and highlighted the impact of both on policy-making. They underlined the need for statistical and data literacy in policy-making and identify key elements of it. They also elaborated on how statistical and data literacy in policy-making is specific. The individual contributions to the SJIAOS special stream originated from the ISI World Statistics Congress 2021 Invited Paper Session on 'Statistical and Data Literacy in Policy-Making'.

Presenters

- Reija Helenius, Group Leader, Director | Statistics Finland & International Statistical Literacy Project

- Steve MacFeely, Director of Data and Analytics | WHO & ISLP

- Walter Radermacher, Professor | Ludwig-Maximilians-University Munich & Chair of the ISI Advisory Board on Ethics & President | FENStatS: "Statistical Awareness Promoting a Data Culture"

- Giulio Sabbati, Head of Statistical and Data Visualisation Support Office | European Parliamentary Research Service: "Statistical and Data Literacy: A Practitioner's View on Policy-making: How to provide independent, objective and authoritative data and information for policy-making"

- Milo Schield, Statistical Literacy Consultant | University of New Mexico: "Statistical Literacy: Seven Simple Questions for Policymakers"

- Katharina Schüller, CEO & founder | StatUp & Board member | German Statistical Society: "Data and AI Literacy for Everyone"

- Gaby Umbach, Part-time Professor, Robert Schuman Centre for Advanced Studies | European University Institute: "Statistical and data literacy in policy-making"

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Walter J. Radermacher presented his analysis of statistical awareness promoting a data culture. As outlined in his SJIAOS article, "[g]ood statistics can do a lot of good: They help to base decisions on factual arguments, they can simplify conflict resolution. This requires an understanding of the opportunities and risks, the strengths, and limitations of statistical facts. Overestimation leads to exaggerated expectations and disappointments, underestimation to missed opportunities, risks. Even worse is the trouble if facts are influenced or manipulated with political intentions or if even the impression of arbitrariness is created with so-called 'alternative facts'. The very bad excesses of political misuse of statistics are carried out with intent and not negligently. Nevertheless, it can be argued that the virus of false and manipulated information flourishes when the statistical literacy of the population is at a low level. On the less serious scale of missed opportunities or too high expectations regarding statistics, there are, of course, also observations that suggest that an improvement in statistical literacy would be very good for politics, both on the part of the population and on the part of politics itself. Overall, the aim must be to promote and nurture a culture in which a conscious and experienced approach regarding data and statistics has become the standard."

Walter J. Radermacher (2022): Statistical awareness promoting a data culture, in: Statistical Journal of the IAOS 38(2), pp. 453–461, DOI 10.3233/SJI-220956, IOS Press.

Giulio Sabbati discussed statistical and data literacy from a practitioner's view on policy-making. He stated that „[d]ata literacy is the ability to search, read, understand, create, and communicate with data; to ask the right questions about the data; to know what can or cannot be said; to explain a story, or better, provide insights with data, in the form of infographics or other visually appealing elements. The respective knowledge profile can be referred to as that of a data scientist. Within policy-making a key question is what role the data scientist, working with or for policy-makers, should play. Moreover, the skills and capabilities they should master are crucial to understanding, for instance, what type of information policy-makers need, or what is the right format to communicate data and statistics to them. Likewise, for policy-makers it is important to recognise the skills needed to understand the messages deriving from data, and how data scientists can help them to understand such data. [In his SJIAOS article he gave] a practitioner's view on data literacy for policy-making ..[and] highlight[ed] the steps that a data scientist follows to communicate insights from data and statistics in the form of data visualisation and infographics. [He] look[ed] at the tasks performed by a data scientist when preparing such papers. The ability to undertake such tasks can be regarded as essential skills or know-how to help those who cannot work effectively with data."

Giulio Sabbati (2022): Statistical and Data Literacy, a practitioner's view for policy-making: How to provide independent, objective and authoritative data and information for policy-making, in: Statistical Journal of the IAOS 38(2), pp. 463–469, DOI 10.3233/SJI-220942, IOS Press.

Milo Schield approached statistical literacy by asking seven simple questions for policymakers.

Policy makers deal with unfamiliar situations by asking questions. Seeing statistics as different from numbers is an unfamiliar situation. Here are seven simple questions in dealing with statistics. Q1. How big, how many, how much? Q2. Compared to what? Q3. Why not express a count or amount as a rate? Q4. Per what (the Diabolical Denominator)? Q5. How were things defined, counted, measured, summarized or presented? Q6. Is this a crude association? If not, what things were taken into account? Q7. What else could/should have been taken into account (controlled for)? Policymakers should treat statistics the same way they treat people. People have motives, values and agendas. So do statistics – because they were selected, assembled and presented by people who have motives, values and agendas. Statistics are closer to words than to numbers. Yes, statistics involve numbers, but statistics are numbers in context and the words give the context.

Milo Schield (2022): Statistical literacy: Seven simple questions for policymakers, in: Statistical Journal of the IAOS 38(2), pp. 471–475, DOI 10.3233/SJI-220957, IOS Press.

Katharina Schüller elaborated on data and AI literacy for everyone. She proposed a „framework for data and AI literacy" that aimed „to create a common understanding of data and AI literacy so that it can be systematically included into curricula and educational standards of schools, teacher training, higher education, and further education. The purpose of the framework is to facilitate the respective set of skills and competencies to be taught as a transdisciplinary competence across all subjects from

three perspectives: the application-oriented, the technical-methodological, and the socio-cultural perspective. The framework provides a pathway to establishing basic data literacy for everyone, to enable 21st Century citizens to deal with data and AI in a conscious and ethically sound manner. The framework can also serve as a reference for data and AI literacy programs for extracurricular and vocational training, to enable lifelong learning of data and AI literacy. Therefore, it can be a useful template for public statistical institutions planning to offer data literacy trainings for the public, responding to the challenges resulting from the changing roles and expectations of actors in a data-driven society. A detailed example for such an application, the app "Stadt j Land j Datenfluss", demonstrates the benefit of the framework for the purpose of adult education."

Katharina Schüller (2022): Data and AI literacy for everyone, in: Statistical Journal of the IAOS 38(2), pp. 477–490, DOI 10.3233/SJI-220941, IOS Press.

Gaby Umbach highlighted conceptual aspects of statistical and data literacy in policy-making. She offered general reflections on statistical and data literacy in policy-making and discussed "the relevance of the use of statistics and data in politics and highlights their impact on policy-making". She underlined "the need for and identifie[d] key meanings of statistical and data literacy in policy-making". In her presentation, she "also highlight[ed] how statistical and data literacy in policy-making is specific." For this, she elaborated on the functions and impacts of statistics and data in policy-making and related them to skills and literacy needs for actors engaged in policy-making to be able to turn statistical information into knowledge for policy-making. She underlined that "[p]olitical actors need to be statistically and data literate to be able to use statistics and data for the public good. They need to understand the potential of and sensitivities arising from the use of statistics and data and they need to have the skills to identify their misuse". In this sense, statistical and data literacy in politics was intersectional and went beyond numerical skills, being heavily influenced by the ability to contextualise data analysis and use.

Gaby Umbach (2022): Statistical and data literacy in policy-making, in: Statistical Journal of the IAOS 38(2), pp. 445–452, DOI 10.3233/SJI-220962, IOS Press.

Publications:

- Debora Valentina Malito, Gaby Umbach, Nehal Bhuta (eds.) (2018): The Palgrave Handbook on Indicators in Global Governance, Palgrave Macmillan, https://doi.org/10.1007/978-3-319-62707-6.

- Debora Malito, Gaby Umbach, Antonio Savoia, David Hulme (2021): Measuring Governance to achieve Sustainable Development: Promises and Challenges, in: Walter Leal Filho, A.M. Azul, Luciana Brandli, Pinar G. Özuyar, Tony Wall (eds.): Encyclopedia of the UN Sustainable Development Goals, SDG 16: Peace, Justice and Strong Institutions, Springer, pp. 1-8, https://doi.org/10.1007/978-3-319-71066-2_32-1.

- Walter J. Radermacher (2022): Statistical awareness promoting a data culture, in: Statistical Journal of the IAOS 38(2), pp. 453–461, IOS Press, DOI 10.3233/SJI-220956.

- Giulio Sabbati (2022): Statistical and Data Literacy, a practitioner's view for policy-making: How to provide independent, objective and authoritative data and information for policy-making, in: Statistical Journal of the IAOS 38(2), pp. 463–469, IOS Press, DOI 10.3233/SJI-220942.

- Milo Schield (2022): Statistical literacy: Seven simple questions for policymakers, in: Statistical Journal of the IAOS 38(2), pp. 471–475, IOS Press, DOI 10.3233/SJI-220957.

- Katharina Schüller (2022): Data and AI literacy for everyone, in: Statistical Journal of the IAOS 38(2), pp. 477–490, IOS Press, DOI 10.3233/SJI-220941.

- Gaby Umbach (2022): Statistical and data literacy in policy-making, in: Statistical Journal of the IAOS 38(2), pp. 445–452, IOS Press, DOI 10.3233/SJI-220962.

- Gaby Umbach (2020): Of Numbers, Narratives and Challenges: Data as Evidence in 21st Century Policy-Making, Statistical Journal of the IAOS (SJIAOS), Special Feature on Governing by the Numbers – Statistical Governance, Walter Radermacher (ed.), 36(4), pp. 1043-1055, DOI 10.3233/SJI-200735.

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AUSTRALIA

Connecting Students with Statistics, Systems Thinking, Sustainability and STEM (Science, Technology, Engineering, Mathematics)

Peter Howley*

Australia's National Schools Poster Competition (NSPC) is entering its 10th year in 2023...and we have some great news!

Background

The Australian NSPC provides an opportunity for students from Years 3 to 12 (ages 8 to 18) to work in teams of 2 to 5 and develop, implement and creatively report upon, in poster format, an investigation on any topic of interest to them. Students conduct small-scale versions of real-world investigations in teams, developing core statistical, STEM and cross-functional skills. They create an informative e-poster presentation communicating their investigation clearly, concisely and creatively.

The competition is judged in five divisions: one for each of the Year 3-4, 5-6, 7-8, 9-10, 11-12 School Grades. Many additional resources are provided at the www.ssapostercomp.info website, including:

- 1 to 4-minute videos about the competition

- Several approximate 4-minute videos from experts speaking on careers in statistics

- Free software and simple worksheets

- A dozen or so approximate 4-minute animated videos on introductory statistics topics

- Tips, e-textbook, a file on how the NSPC links to and supports the National Curriculum

- Annual lists of the winners and honourable mentions and their posters, along with feedback for each that is publicly available (since 2021) – to assist everyone in their future investigations.

Submissions are due annually by 10 November and we usually receive over 200 team entries.

Prizes (for both the winning team and the school of the winning team, for each Division) and honoraria for the many judges (professional statisticians) and IT and administrative support are possible thanks to support from the Australian Bureau of Statistics via the Statistical Society of Australia.

The importance of engaging students early in any endeavour, particularly statistics in this Data Age, cannot be overstated. Youth establish interests and career trajectories from an early age and connecting them with opportunities that are enjoyable, engaging, authentic and support the needed emerging workforce skills is critical.

School teachers have rarely if ever experienced statistics in practice and are unfamiliar with the diverse nature and wide reach of statistical thinking, techniques and applications. Teachers' knowledge about the practicing statistician is at best limited, their focus has been on the many other topics and aspects of teaching. The teaching of statistics in secondary school focusses on the theory or mechanics, rather than its practical applications, with statistics topics taught often in a manner not clearly part of a coherent whole nor authentically contextualised. The relevance of the discipline of statistics to areas of interest is lost, or at best unclear, for students; yet relevance is such a powerful motivator.

A study published in SERJ in 2020 reported upon the success in 2017 improving teachers' and students' interests, confidence, awareness and aspirations in statistics, in regional and rural schools in the State of New South Wales in Australia, through an initiative which combined the NSPC with the field of sustainability and STEM more broadly.

Significant news for 2023!

In 2023, Emeritus Professor Tim Roberts AM and I will be expanding on the above and delivering a national initiative in Australia entitled **_"Preparing for Industry 5.0 and beyond in light of COVID19–facilitating the cradle-to-career life cycle"_** having received a Commonwealth Grant from the Australian Government's Department of Education's Emerging Priorities Program for our project proposal.

Industry 5.0 places research and innovation at the service of the transition to a sustainable, human-centric and resilient industry. Research & innovation and the associated cross-functional skills required are fundamental to, and supported by statistics, systems thinking, sustainability and STEM skills … and these are the points of focus of this project.

As part of facilitating the _cradle-to-career life_ cycle and preparing the future workforce, the project will support students' and educators' development of statistics, systems thinking, sustainability and STEM (SSSS) skills.

The 2023 project will involve the integrated delivery of:

• interactive online teacher Professional Learning workshops

• interactive online student workshops

• two national student competitions – the NSPC and a mini-solar vehicle competition

all surrounding the development of SSSS skills which support national curriculum learning areas and outcomes, general capabilities and cross-curriculum priorities, and emerging workforce environments and needs as part of societal and economic transitions.

The initiative will have significant engagement across the Australian education system with school educators, teachers and students, and we will seek to make a step-change in attitudes, aspirations and abilities of educators and the future workforce surround these core SSSS skills.

We are looking forward to realising the potential of this initiative!

There is also an opportunity for organisations to sponsor the NSPC and be part of connecting with and inspiring our educators and future workforce about potential pathways, careers and products. Interested organisations are welcome to contact me via peterhowley0@gmail.com or SSSS@postercomp.info!

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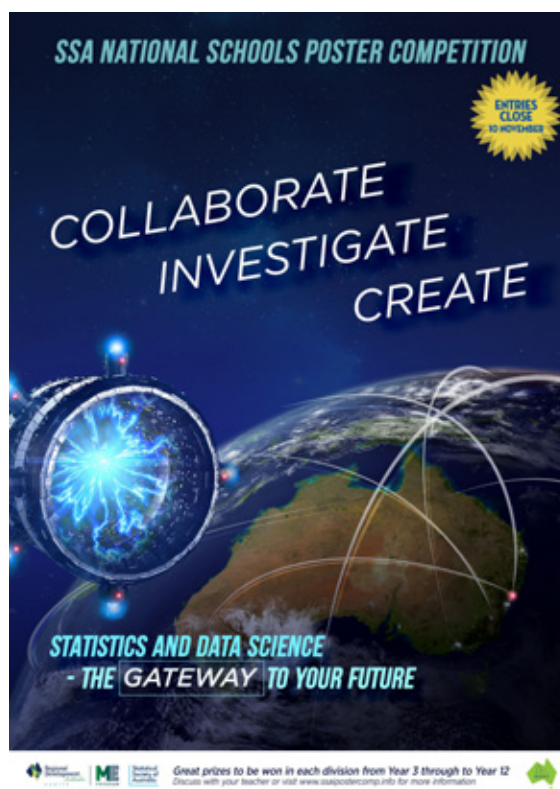
Pak Institute of Statistical Training & Research

presents

1st PISTAR GLOBAL STATISTICS CONFERENCE
1st PISTAR GSC 2023

&

PRE-CONFERENCE WORKSHOPS

CONFERENCE & WORKSHOP CHAIR:
PROF. DR. SALEHA NAGHMI HABIBULLAH
HONORARY EXECUTIVE DIRECTOR PISTAR

CONFERENCE & WORKSHOP SECRETARY:
DR. SYED WASIM ABBAS
HONORARY GENERAL SECRETARY PISTAR

21ST & 22ND JANUARY 2023
SATURDAY & SUNDAY

☐ OUR VISION

www.pistar.org

A statistically advanced society through professional development and research-based knowledge and information in Pakistan and beyond.

☐ OUR MISSION

To establish a state-of-the-art platform of highly capable statisticians to provide training and consultancy services for professional development, and to promote a research culture leading to scientific and analytical thinking, and to data-based sound decision-making through a dynamic organization, proactive client-feedback system and user-friendliness.

IMPORTANT DATES

Submission of Abstract of Paper/Poster for *inclusion* in Best Paper/Best Poster Competition (No more than 500 words)	December 12, 2022
Acceptance of Abstract submitted for *inclusion* in Best Paper/Best Poster Competition:	December 14, 2022
Full Length Paper/Poster Submission for *inclusion* in Best Paper/Best Poster Competition	December 31, 2022
Submission of Abstract of Paper/Poster *not to be included in* Best Paper/Best Poster Competition (No more than 500 words)	December 22, 2022
Acceptance of Abstract submitted *not to be included in* Best Paper/Best Poster Competition:	December 24, 2022
Full Length Paper/Poster Submission *not to be included in* Best Paper/Best Poster Competition	January 15, 2023
Registration for Conference	Early Bird: By December 21, 2022 Regular: After December 21, 2022
Registration for Workshop 1/Workshop 2/Workshop 3/ Any two of them/All three of them	Early Bird: By December 21, 2022 Regular: After December 21, 2022

THE CONFERENCE WILL FOCUS ON LATEST DEVELOPMENTS IN STATISTICS AND STATISTICAL ASPECTS OF DATA SCIENCE.

Get Registered Now

EVENT LOCATION

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1ˢᵗ PISTAR GLOBAL STATISTICS CONFERENCE
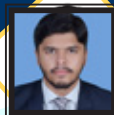**1st PISTAR GSC 2023**

&

PRE-CONFERENCE WORKSHOPS

DAY 1: PRE-CONFERENCE WORKSHOPS

SATURDAY 21ˢᵀ JANUARY 2023

RESOURCE PERSONS

ANALYZING QUESTIONNAIRE DATA USING R
DR. ALIA SAJJAD
McGill University
Canada

DATA VISUALIZATION WITH EXCEL
MUHAMMAD JAWAD MIRZA
Consultant, Eminent Solutions, Lahore
Pakistan

TIME SERIES FORECASTING IN R
DR. HARIS KHURRAM
FAST NU, CFD
Pakistan

0 WORKSHOPS PROGRAM

Time (PKT)	Activity
09:15 to 09:25	Opening Remarks
09:25 to 09:30	Introduction of Mr. Muhammad Jawad Mirza (Pakistan)
09:30 to 11:45	Workshop on Data Visualization with Excel
11:45 to 11:55	Feedback from participants
11:55 to 12:25	Break along with: PISTAR & ISOSS Info Slides & Networking
12:25 to 12:30	Introduction of Dr. Haris Khurram (Pakistan)
12:30 to 14:45	Workshop on Time Series Forecasting in R
14:45 to 14:55	Feedback from participants
14:55 to 15:25	Break along with: PISTAR & ISOSS Info Slides & Networking
15:25 to 15:30	Introduction of Dr. Alia Sajjad (Canada)
15:30 to 17:40	Workshop on Analyzing Questionnaire Data using R
17:40 to 17:50	Feedback from participants
17:50 to 18:00	Closing Session Display of Certificates Senior Vice President's Address

REGISTRATION FEE PER WORKSHOP

	By Dec 21, 2022	After Dec 21, 2022
Participants from Developing Countries*	USD 10	USD 15
Participants from Developed Countries*	USD 20	USD 30
Participants from within Pakistan	PKR 1000	PKR 1500

*For the list of developing countries, see
https://www.isi-web.org/resources/developing-countries

Get Registered Now

EVENT LOCATION

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1st PISTAR GSC 2023
&
PRE-CONFERENCE WORKSHOPS

DAY 2: CONFERENCE

SUNDAY 22ND JANUARY 2023

INVITED SPEAKERS

DR. DAVID STERN
IDEMS International
UK

PROF. DR. BRUNO DE SOUSA
University of Coimbra
Portugal

PROF. WALTER RADERMACHER
University of Munich
Germany

PROF. DR. SALIM UR REHMAN
SUIT Peshawar
Pakistan

PROF. DR. MUHAMMAD HANIF
President ISOSS & PISTAR
NCBA&E Lahore, Pakistan

☐ CONFERENCE PROGRAM

Time (PKT)	Activity	Time (PKT)	Activity
08:45 to 08:55	Opening Remarks	12:00 to 12:30	**Invited** Paper Session 4: *Insights into the project TrainBayes – a training study on Bayesian Reasoning for medical and law students* by **Theresa Buechter & Nicole Steib**
08:55 to 09:00	Words of Welcome	12:30 to 13:28	**Contributed** Papers Parallel Sessions (Simultaneous Virtual Rooms)
09:00 to 09:58	**Contributed** Papers Parallel Sessions (Simultaneous Virtual Rooms)	13:28 to 13:55	**Poster Session** (Display & **Verbal Presentation** of Posters by *randomly selected* contestants)
09:58 to 10:15	Short Break along with: **PISTAR Info Slides** & Networking **ISOSS Info Slides** & Networking (Virtual Rooms 1 & 2)	13:55 to 14:20	**Invited** Paper Session 5: by **Prof. Dr. Bruno de Sousa**
10:15 to 10:45	**Invited** Paper Session 1: *Neutrosophic Statistics* by **Dr. Hina Khan**	14:20 to 14:45	**Invited** Paper Session 6: by **Prof. Dr. Walter Radermacher**
10:45 to 11:15	**Invited** Paper Session 2: *Applications, Uses and Abuses of Probability and Statistics in our daily lives - an Engineer's Perspective* by **Prof. Dr. Salim ur Rahman**	14:45 to 15:40	**Invited Panel Session** on *How to promote Statistical Literacy among people of other disciplines, in both the developed and the developing countries?* Organized and Chaired by **Dr. David Stern**
11:15 to 11:30	Short Break along with **Poster Exhibition** & Networking	15:40 to 16:20	**AGM 2023** *(One of the important Agenda Points will be suggestions by the membership regarding measures that can be taken by PISTAR for the enhancement and elevation of statistical education, the statistical profession and the statistical community in Pakistan and around the world.)*
11:30 to 12:00	**Invited** Paper Session 3: *Stress Strength Interference Theory and Reliable Life Prediction of Manufactured Parts* by **Prof. Dr. Anwar Khalil Sheikh**	16:20 to 17:00	Closing Session *Display of **Certificates, Announcement of Results** of the **Best Paper Competition** and of the **Best Poster Competition*** **President's Address: Prof. Dr. Muhammad Hanif**

FOR MORE INFORMATION

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EVENT LOCATION

☐ **Virtual Through Zoom**

International Statistical Poster Competition 2022–2023

The Poster Competition has started in January 2022.

Proposals should be sent to the ISLP Project Coordinator,

Elisa Falck, by the end of April 2023.

To sign up, contact islp.coordination@gmail.com.

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